PEER REVIEW HISTORY

ARTICLE DETAILS

TITLE (PROVISIONAL)	Investigation of the conditions affecting the joining of Hungarian hospitals to an accreditation programme: a cross-sectional study
AUTHORS	Dombrádi, Viktor; Margitai, Barnabás; Dózsa, Csaba; Csenteri, Orsolya Karola; Sándor, János; Gáll, Tibor; Gődény, Sándor

VERSION 1 – REVIEW

REVIEWER	Nesibe Akdemir OLVG Teaching Hospital Amsterdam VU University Medical Center Amsterdam The Netherlands
REVIEW RETURNED	20-Sep-2017

GENERAL COMMENTS	Thank you for the opportunity to review this paper about accreditation. This is an interesting paper, which addresses a relatively under-investigated area. It focuses on the important domain of accreditation in the health care sector. Accreditation is a complex phenomenon. As for the paper I could imagine that rewriting some parts could benefit the paper. In the following section I will comment on each part of the manuscript separately. Title and abstract The current title is very comprehensive. However I would recommend a more attractive and more to-the-point title, which could give the readers quickly a notion of the content of the article. It could be helpful to revise and shorten the title slightly. The abstract covers the article well and is complete, except for the 'objective'. On page 2 lines 6-8 the authors are mentioning the gap and I quote 'the question of why hospitals apply for an accreditation has not yet been explored', however this does not align with the research question and introduction of the manuscript. This might be confusing for the readers. Introduction The introduction gives a fine description of the problem and research question. I was wondering why the authors choose to merely focus on quantitative studies, see also the first sentence of the introduction. The conceptual model of Donabedian is mentioned in the introduction, however this is not used in the methods, results or discussion section. I was wondering if this is worth mentioning, since it is already a complex subject.

Methods
I thought that the statistics were described fully and to the best of my knowledge it seems appropriate. However I would like to stress out I am not an expert in statistics.
The reason behind the exclusion criteria, no private hospitals and the necessity of certain departments, was not clear for me as reader. In addition I also missed the group of hospitals who did not join the survey, how much of them participated in the preparatory project for the BELLA? Is their any explanation or reason why they did not participate in the survey?

Results and discussion
If I am correct there are two main messages in this paper; the first one is that this study suggests that it does not matter what the starting point is of a hospital to apply for accreditation. The second message can be found on page 14 lines 16-18: 'future differences can be solely contributed to the accreditation'. I think the results and discussion sections convey these strong messages, however I would like to suggest to further underline these strong messages in the discussion section and maybe also in the abstract.
In addition the authors could consider deleting table 5, since it has not much added value to the text in my opinion.

Conclusion
The conclusion is comprehensive and correct. I only have one remark for the conclusion section, which is similar to my comment on the abstract. The authors mentioned on page 16 lines 3-5 and I quote 'to better understand why hospitals apply for an accreditation, a different approach is needed'. I would like to suggest rephrasing this part, since this paper does not cover this gap. I was also wondering what kind of approaches do the authors think of and did they consider that this question is maybe not answerable with solely quantitative research.

Overall a very interesting paper that could benefit from rethinking and adjusting some sections.

REVIEWER	Ana Maria Saut University of São Paulo (Brazil)
REVIEW RETURNED	20-Sep-2017

GENERAL COMMENTS	It was a pleasure working on your document. I have organized the comments and suggestions according to the paper sections. However, the comments on research method and results analysis will be the most critical points for your review. 1. Introduction There are many articles being published about accreditation, and it was observed that some references cited are not the most recent contributions. The authors cited (on line 22, page 4 - reference 10) a systematic review performed by Australian researchers in 2008; while its contribution is unquestionable, the same authors published an updated review in 2012. Hinchcliff R, Greenfield D, Moldovan M, Westbrook JI, Pawsey M, Mumford V, et al. Narrative synthesis of health service accreditation literature. BMJ Quality and Safety, 2012;21:979–91. doi:10.1136/bmjqs-2012-000852.

	2. Method Data collection and data processing – page 6 – lines 30-48: The authors briefly explained how the questionnaire was designed, but they did not cite their reference(s) or present the questions. Additionally, the variables measured/constructs are not self-explanatory (for instance, 'quality management'). It is very difficult to understand what was really measured in the research without this information. Furthermore, this data could improve the methodological research rigor. Regarding statistical analysis, the study objectives were defined as: '…to determine if the general hospitals, before joining the nationwide preparatory project for BELLA accreditation, had MORE MATURE quality management, … compared to the other general hospitals that did not join the project. The second aim was to investigate how the financial status of the hospitals might have influenced the decision to apply for this preparatory project. …we assumed that general hospitals with a WORSE financial background were more open to join the project'. (Methods – Aims of the study – page 6 – lines 7-24). If the objective is to test whether one group had better quality results and a worse financial background than the other group, the statistical hypothesis test should be aligned to this objective (one-tailed test). However, the analysis done was of the difference between the two groups (two-tailed test) ('To determine the statistical significance of the differences between the two groups…' - Methods - Statistical analysis – page 8 – lines 44 -48). The statistical method of analysis is not appropriate to answer the research question. 3. Results analysis In the subsection: Comparative statistics, page 13 – lines 5-17: '…revealed no statistically significant differences in any of the measured activities (table 4). However, it is worth mentioning that in quality management, internal professional regulation and infection control, the difference was greater than 5%, which in all cases favoured the participants of the project. Additionally, the hospitals that participated in the preparatory project had lower means of debt per bed number and per the number of discharged patients than those that did not join, but the differences were not statistically significant (table 5)'. Since the authors carried out a statistical analysis and concluded that there is no evidence of statistically significant differences, they should not discuss the difference of 5%. It is not valid/true, as the results indicate that they are not different. Regarding the financial variables, page 13 – Table 5: The data show a high standard deviation for all categories analysed. This sample variance and heterogeneity were not discussed in the study. Since the variance is high, the authors could: - Show the descriptive analyses of the debt variable (min, max, average, median and quartiles); - Perform an outlier analysis; - Try to identify some strata of the sample with a more homogeneous debt value, considering the institutions' characteristics (from Table 1) – for instance, the sample can be stratified by number of beds; and - After that, if the standard deviation is still high, increasing the sample size could be considered as an opportunity for future research. 4. Final comments and suggestions a. Page 10 - Table 2 - Column Cronbach´s alpha: Please check if the value is the coefficient or p-value (written between square brackets).

	b. Review the descriptive analysis of the results by health organization to answer the following: Among the organizations that participated and did not participate in the preparatory project, what were the maximum grade, minimum, median, average, standard deviation, and first and third quartiles?

REVIEWER	Triona Fortune Fortune Quality Accreditation Services Ireland
REVIEW RETURNED	24-Sep-2017

GENERAL COMMENTS	This is a very robust piece of research and the authors clearly appreciate the previous research into this topic. Despite the fact that English is not their first language, it's very well written. The use of the word "debt" in its present context is slightly confusing but does not take from the over all understanding. This research and article greatly add to the limited evaluation in this topic.

VERSION 1 – AUTHOR RESPONSE

RW-1-1: The current title is very comprehensive. However I would recommend a more attractive and more to-the-point title, which could give the readers quickly a notion of the content of the article. It could be helpful to revise and shorten the title slightly.

AU-1-1: We originally were also thinking about to give a shorter, more to-the-point title. However, the journal's guide for authors states: 'The article title should include the research question and the study design. Titles should not declare the results of the study.' Our study examines many variables, thus, to comply with this requirement, we have to list all of them in the title.

After doing a quick search in PubMed, it seems that the articles published under BMJ Open are more 'technical' than 'attractive'. Thus, if you do not mind, we would like to retain the title as it is.

RW-1-2: The abstract covers the article well and is complete, except for the 'objective'. On page 2 lines 6-8 the authors are mentioning the gap and I quote 'the question of why hospitals apply for an accreditation has not yet been explored', however this does align with the research question and introduction of the manuscript. This might be confusing for the readers.

AU-1-2: That statement was poorly drafted. We apologize for the mistake. The sentence was replaced with "However, neither of these explored the general conditions before applying for an accreditation."

RW-1-3: The introduction gives a fine description of the problem and research question. I was wondering why the authors choose to merely focus on quantitative studies, see also the first sentence of the introduction.

AU-1-3: There is a wealth of literature regarding accreditation in healthcare which includes quantitative, qualitative, and systematic review studies. We decided to include quantitative studies only in the introduction to highlight the necessity of our research.

RW-1-4: The conceptual model of Donabedian is mentioned in the introduction, however this is not used in the methods, results or discussion section. I was wondering if this is worth mentioning, since it is already a complex subject.

AU-1-4: We mentioned Donabedian's structure-process-outcome to connect the process focused studies with the outcome based studies within the introduction. However, we have to agree that this is not a necessity and it does not contribute to our study in any way. Thus, Donabedian's model is no longer mentioned in the revised introduction.

RW-1-5: I thought that the statistics were described fully and to the best of my knowledge it seems appropriate. However I would like to stress out I am not an expert in statistics. The reason behind the exclusion criteria, no private hospitals and the necessity of certain departments, was not clear for me as reader.

AU-1-5: Quantitative studies investigating the possible associations and impacts of accreditation and certification in hospital care have been conducted exclusively in general hospitals. The unwritten reason behind it is that the finding in specialized hospitals cannot be generalized to other hospitals. Alas, the meaning of 'general hospital' is very ambiguous and there is no definition which researches could uniformly use. The criterion for being a general hospital used in this study is the same as in another of our recently published paper.

The reasons for the exclusion of private hospitals from this study are the followings: (i) there are not many of them in Hungary, (ii) they usually specialize in certain types of cares and (iii) they rarely take part in government or academic surveys. This unfortunately means that it is nearly impossible to conduct a general survey in Hungary where a sufficient number of private hospitals would participate. Thus, our results can be generalized only to the public general hospitals.

The four departments of inpatient medicine for adults, inpatient medicine for children, surgery, and obstetrics are considered to be the four basic service provider units within hospital care. If any of them are missing, then the hospital cannot provide a comprehensive care. Using this as a criterion for general hospital may look a bit arbitrary; however, as mentioned above, since there is no uniform definition for general hospital we had to use our own criteria.

In our revision, we now mention that there is no uniform definition for general hospital, and that is the reason why we choose the criterion mentioned above. Also, in the 'strengths and limitations' section we briefly describe the reason why there were no private hospitals included in this study.

RW-1-6: In addition I also missed the group of hospitals who did not join the survey, how much of them participated in the preparatory project for the BELLA? Is their any explanation or reason why they did not participate in the survey?

AU-1-6: Overall, 45 medical institutions took part in the preparatory project for the BELLA. 30 were hospitals and 15 provided outpatient care only. Of the 30 hospitals 19 met the criterion for being a general hospital. Of the 19 general hospitals that participated in the project 14 of them took part in the 2013 hospital survey and 5 did not.

Although, both the Department of Health Policy of the Hungarian Ministry of Human Capacities supported our survey, not all hospitals elected to participate in it. Some of the refractory hospitals later decided to join the preparatory project for the BELLA. Unfortunately, in Hungary there is a general hesitation among hospitals when they are asked by a central authority to provide extra data outside what is required by law. That is the reason why we considered 71.7% as an exceptionally good response rate.

In the introduction section, now we mention the number of hospitals participating in the preparatory project for the BELLA. Also, at the beginning of the results section, we describe how many did not meet the criterion of general hospitals and how many did not take part in the survey.

RW-1-7: If I am correct there are two main messages in this paper; the first one is that this study suggests that it does not matter what the starting point is of a hospital to apply for accreditation. The second message can be found on page 14 lines 16-18: 'future differences can be solely contributed to the accreditation'. I think the results and discussion sections convey these strong messages, however I would like to suggest to further underline these strong messages in the discussion section and maybe also in the abstract.

AU-1-7: We added an extra sentence conveying the implications of our findings within the discussion section. Also, in the abstract the conclusion was completely rewritten in accordance with the suggestion.

RW-1-8: In addition the authors could consider deleting table 5, since it has not much added value to the text in my opinion.

AU-1-8: The fourth reviewer suggested that we complement this table with additional information (see: RW-4-5). We agree that, the original version did not add additional value; however, we hope that the revised version does.

RW-1-9: The conclusion is comprehensive and correct. I only have one remark for the conclusion section, which is similar to my comment on the abstract. The authors mentioned on page 16 lines 3-5 and I quote 'to better understand why hospitals apply for an accreditation, a different approach is needed'. I would like to suggest rephrasing this part, since this paper does not cover this gap.

AU-1-9: We agree that similarly to the abstract the conclusion section was written rather poorly. Again, we apologize for this shortcoming here. We have rewritten this part so that the revised version now puts more emphasis on the actual key findings of the study.

RW-1-10: I was also wondering what kind of approaches do the authors think of and did they consider that this question is maybe not answerable with solely quantitative research.

AU-1-10: The problem with the quantitative research method is that it has many built in unspoken assumptions which may not always be true. Thus, the most straightforward approach would be to conduct interviews with both the top managers of the hospitals that joined the preparatory project for the BELLA and with those who did not. Although, the results would be difficult to generalize and it would require a lot of time and effort to conduct, this approach could answer the question. At the very end of the conclusion we mention interviews as one possible approach for further studies.

The second reviewer did not send any remarks.

We would like to thank the third reviewer for the positive evaluation of our work.

The fourth reviewer sent the comment within the "Final_review.pdf" document. Our responses to these comments are as follows:

RW-4-1: There are many articles being published about accreditation, and it was observed that some references cited are not the most recent contributions. The authors cited (on line 22, page 4 - reference 10) a systematic review performed by Australian researchers in 2008; while its contribution is unquestionable, the same authors published an updated review in 2012.

AU-4-1: In accordance with this remark the 2008 review was replaced with the one published in 2012. In addition, two more recently published articles have been included in the revised introduction section.

RW-4-2: Data collection and data processing – page 6 – lines 30-48: The authors briefly explained how the questionnaire was designed, but they did not cite their reference(s) or present the questions. Additionally, the variables measured/constructs are not self-explanatory (for instance, 'quality management'). It is very difficult to understand what was really measured in the research without this information. Furthermore, this data could improve the methodological research rigor.

AU-4-2: We understand this concern. We now mention that the predecessor of the questionnaire used in our study was also used for research purposes. The results of this research were published in a peer-reviewed scholarly journal (Dombrádi et al., Association between the application of ISO 9001:2008 alone or in combination with health-specific standards and quality-related activities in Hungarian hospitals. 2017). Also, each dimension is now briefly introduced, so that the reader will have a better understanding what these dimension measure.

RW-4-3: Regarding statistical analysis, the study objectives were defined as: '…to determine if the general hospitals, before joining the nationwide preparatory project for BELLA accreditation, had MORE MATURE quality management, … compared to the other general hospitals that did not join the project. The second aim was to investigate how the financial status of the hospitals might have influenced the decision to apply for this preparatory project. …we assumed that general hospitals with a WORSE financial background were more open to join the project'. (Methods – Aims of the study – page 6 – lines 7-24). If the objective is to test whether one group had better quality results and a worse financial background than the other group, the statistical hypothesis test should be aligned to this objective (one-tailed test). However, the analysis done was of the difference between the two groups (two-tailed test) ('To determine the statistical significance of the differences between the two groups…' - Methods - Statistical analysis – page 8 – lines 44 -48). The statistical method of analysis is not appropriate to answer the research question.

AU-4-3: This was a serious error from our part as we let the results influence our stated aim. In reality, both aims could have gone both ways. For example, hospitals with a more mature quality management might have joined the preparatory project because of the top managements' dedication to high quality of care. But hospitals with worse quality management could have also taken the initiative, as they might have seen this opportunity to catch up with those performing better. The same is true regarding the financial status of the hospitals. Either the hospitals with better financial status were the ones that could afford to apply for the project, or because of the lack of it the hospitals joining were desperate to get the financial benefits that came with the project. As this is an exploratory study and no similar studies were conducted on the topic, both assumptions should have been seen as feasible. Again, this was a serious mistake, and in accord with this realisation, we have rewritten the aims.

RW-4-4: In the subsection: Comparative statistics, page 13 – lines 5-17: '…revealed no statistically significant differences in any of the measured activities (table 4). However, it is worth mentioning that in quality management, internal professional regulation and infection control, the difference was greater than 5%, which in all cases favoured the participants of the project. Additionally, the hospitals that participated in the preparatory project had lower means of debt per bed number and per the number of discharged patients than those that did not join, but the differences were not statistically significant (table 5)'. Since the authors carried out a statistical analysis and concluded that there is no evidence of statistically significant differences, they should not discuss the difference of 5%. It is not valid/true, as the results indicate that they are not different.

AU-4-4: We agree with the comment entirely. Therefore we deleted the part mentioning the 5% difference.

RW-4-5: Regarding the financial variables, page 13 – Table 5: The data show a high standard deviation for all categories analysed. This sample variance and heterogeneity were not discussed in the study. Since the variance is high, the authors could: - Show the descriptive analyses of the debt variable (min, max, average, median and quartiles); - Perform an outlier analysis; - Try to identify some strata of the sample with a more homogeneous debt value, considering the institutions' characteristics (from Table 1) – for instance, the sample can be stratified by number of beds; and - After that, if the standard deviation is still high, increasing the sample size could be considered as an opportunity for future research.

AU-4-5: As requested, Table 5 was extended to include the minimum, maximum, mean, median, and first and third quartiles. In our outlier analysis we managed to identify one or two hospitals with very high debt ratio. However, excluding them did not decrease the standard deviation in a meaningful way. Stratifying the data would further decrease the already low sample size. Thus, we mention the high standard deviation in the 'results' and in the 'strengths and limitations' sections as a limiting factor.

RW-4-6: Page 10 - Table 2 - Column Cronbach´s alpha: Please check if the value is the coefficient or p-value (written between square brackets).

AU-4-6: Writing (p-value) under the Cronbach´s alpha in Table 2 was a mistake, since the values in this column shows the alpha coefficient. We would like to apologize for this error that we corrected in the Table.

RW-4-7: Review the descriptive analysis of the results by health organization to answer the following: Among the organizations that participated and did not participate in the preparatory project, what were the maximum grade, minimum, median, average, standard deviation, and first and third quartiles?

AU-4-7: Table 4 has been altered in a way, that it now also shows the maximum, minimum, Q3 and Q1 values of each dimension grouped by participation. The mean, median, standard deviation and interquartile range were already illustrated in Table 4, depending on the normality of distribution shown in Table 2.

We would like to thank the reviewers for their helpful remarks, and do hope that our substantial revision of the manuscript made it acceptable for publication in BMJ Open.

VERSION 2 – REVIEW

REVIEWER	Nesibe Akdemir OLVG Hospital and VU Medical Center Amsterdam in the Netherlands
REVIEW RETURNED	29-Nov-2017

GENERAL COMMENTS	First of all I would like to compliment you with the adequate revision of the manuscript with the help of the suggested changes. As mentioned before, I am not a statistics expert, so I cannot comment on that part. The last comment that I would like to make is that there are some missed opportunities to improve the title, even when the Journal has its criteria. I think it is not an 'intention of the hospital', but more conditions in which hospitals join accreditation. The word 'intention' is also not used in the manuscript. However, this comment is rather optional than a must.

REVIEWER	Ana Maria Saut University of São Paulo Brazil
REVIEW RETURNED	01-Dec-2017

GENERAL COMMENTS	The authors have addressed all my concerns. I have no comments nor any additional suggestions. Thank you to the authors for their careful revision of the manuscript.

VERSION 2 – AUTHOR RESPONSE

First reviewer: First of all I would like to compliment you with the adequate revision of the manuscript with the help of the suggested changes. As mentioned before, I am not a statistics expert, so I cannot comment on that part. The last comment that I would like to make is that there are some missed opportunities to improve the title, even when the Journal has its criteria. I think it is not an 'intention of the hospital', but more conditions in which hospitals join accreditation. The word 'intention' is also not used in the manuscript. However, this comment is rather optional than a must.

Response: We would like to thank the suggestions on how to improve the various sections of the manuscript. These have greatly improved the clarity and the overall-flow of the manuscript. Also, as recommended, we have changed the title from "Investigating the association of the intention to join an accreditation programme with the maturity of quality management, patient care and debt among hospitals: a cross-sectional study in Hungary" to "Investigation of the conditions affecting the joining of Hungarian hospitals to an accreditation programme: a cross-sectional study" We hope that this new title is more to-the-point and is more in synch with the content of the manuscript.

Second reviewer: The authors have addressed all my concerns. I have no comments nor any additional suggestions. Thank you to the authors for their careful revision of the manuscript.

Response: We would like to thank the suggestions regarding the statistical methods and the way to present the results. We believe these have significantly improved the quality of our study.